

rays which succeed in being refracted or bent round through our atmosphere (the amount of bending of the light extending to a maximum of about 70' in the lowest strata of the atmosphere). Into this inner circle, in this case about 2525 miles in diameter at the distance of the moon, no rays of light can stray except those which are scattered by our atmosphere as a sun-illuminated envelope. It is now very evident that the position of the dark patch bordered by the line (*b-c*) and lying partly over the western half of the moon, with respect to the earth's shadow, is very anomalous. If the line (*bc*) had been curved concentrically to the centre of the shadow, it would have been less surprising. The only way in which it can be accounted for is by supposing the earth's atmosphere to have been very opaque about the regions of the earth within the Arctic circle, allowing very little light, if any, to be refracted, and, tracing southwards that meridian along which the moon would be setting at the time, the atmosphere getting clearer and clearer, first in the upper strata and then in the lowest as we go southwards, until the equator is nearly reached. At 10.50 the moon would be illuminated by solar rays refracted by the earth's atmosphere and tangential to the earth's surface along the meridian 105° east of Greenwich (or thereabouts), which passes through Irkutsk (in Siberia), Mongolia, Tonquin, and Siam, along which line the inhabitants would see the moon going down veiled in its mysterious obscurity. It would be interesting to know whether any observers noticed, at about the middle of the eclipse, any contrast between the inner and darker shadow, in which the moon would be largely immersed, and the outer regions of the shadow which are illuminated dimly by both refracted and scattered light. The unusual darkness of this eclipse, surprising, as it must have done, all spectators, must be taken as a strong indication of great opacity in our atmosphere. Another noticeable feature was the unsymmetrical appearance of the illuminated crescent at 10.50, when the northern cusp (*b*) exhibited a bluish-white, shading off gradually from the brilliant white to the obscurity of the shadow, while the other cusp seemed quite sharp and distinct. Observing the eclipse both with the naked eye and through a 4½" equatorial, neither my fellow observers nor myself noticed any other indication of a blue fringe than that appearing just at *b*, which seemed to me therefore to be a real appearance, and not a subjective effect of contrast, as there was not complementary copper colour anywhere on the moon sufficiently strong to suggest the blue, and if there had been I ought to have noticed the blue fringe all along the edge of the shadow bordering on the crescent, but it appeared to me of a neutral grey.

Heworth Green, York

H. DENNIS TAYLOR

### The Red Light round the Sun—The Sun Blue or Green at Setting

I CAN confirm Mr. Backhouse's and Mr. E. D. Archibald's impression about the colour now and for some time past seen round the sun; that it first appeared about November last and has been more or less visible ever since. The colour was then, and still is, sometimes rose, sometimes amber or buff. It is best observed, when the sun on bright days is behind a cloud, round that cloud, in the place where, at other times, broken beams of shadow, thrown out from the cloud like a row of irregular palings and deepening the blue of the sky, are to be seen. Towards sunset it becomes glaring, and white and sallow in hue. Something of a circular shape may then perhaps be made out in it, but it does not seem to me that it ought to be called a halo. A halo, as I understand, is a ring, or at least a round space inclosed by a ring. This appearance has no ring round it. Also in a halo (I have seen numbers) it is the ring that is coloured—either throughout, or at four places where the ends of the four arms of a cross would rest upon it; and the inclosed field is uncoloured or coloured like the rest of the sky: here there is an uninclosed but singularly-coloured field.

But whether we call the appearance a halo or not is perhaps only a question of terms: to call it a corona, as Mr. Leslie does, is another, and, as it seems to me, a hazardous thing, because it would imply that what we are looking at is an appendage of the sun's own (and that too at a time when it is strongly doubted if the sun has a corona of any sort of all), instead of what is much easier to suppose, a terrestrial or atmospheric effect. If there is going on, as Mr. Leslie thinks, an "increase of sun power," this ought to be both felt and measured by exact instruments, not by the untrustworthy impressions of the eye. Now Prof. Piazzi-Smyth says that sunlight, as tested by the spectroscope, is weaker, not stronger, since the

phenomena of last winter began. To set down variations in light and heat to changes in the sun when they may be explained by changes in our atmosphere, is like preferring the Ptolemaic to the Copernican system.

It is, however, right and important to distinguish phenomena really new from old ones first observed under new circumstances which make people unusually observant. A sun seen as green or blue for hours together is a phenomenon only witnessed after the late Krakatoa eruptions (barring some rare reports of like appearances after like outbreaks, and under other exceptional conditions); but a sun which turns green or blue just at setting is, I believe, an old and, we may say, ordinary one, little remarked till lately. I have a note of witnessing it, with other persons of a company, in North Wales on June 23, 1877, the sunset being very clear and bright. It is, possibly, an optical effect only, due to a reaction (from the red or yellow sunset light, to its complementary colour) taking place in the overstrained eye at the moment when the light is suddenly cut off, either by the sun's disappearance or by his entering a much thicker belt of vapour, which, foreshortened as the vapour is close to the horizon, may happen almost instantaneously. And this is confirmed by a kindred phenomenon of sunset. If a very clear, unclouded sun is then gazed at, it often appears not convex, but hollow; swimming—like looking down into a boiling pot or a swinging pail, or into a bowl of quicksilver shaken; and of a lustrous but indistinct blue. The sky about it appears to swell up all round into a lip or brim, and this brim is coloured pink. The colour of the light will at that time be (though the eye becomes deadened to it) between red and yellow. Now it may be noticed that when a candle-flame is looked at through coloured glass, though everything else behind the glass is strongly stained with the colour, the flame is often nearly white: I suppose the light direct from the sun's disk not only to master the red and yellow of the vapour medium, but even, to the eye, to take on something of the complementary blue.

Even since writing the above I have witnessed, though slightly, the phenomenon of a blue setting. The sunset was bright this evening, the sun of a ruddy gold, which colour it kept till nothing was left of it but a star-like spot; then this spot turned, for the twinkling of an eye, a leaden or watery blue, and vanished.

There followed a glow as bright almost as those of last year. Between 6.15 and 6.30 (Dublin time) it was intense: bronzy near the earth; above like peach, or of the bluish colour on ripe hazels. It drew away southwards. It would seem as if the volcanic "wrack" had become a satellite to the earth, like Saturn's rings, and was subject to phases, of which we are now witnessing a vivid one.

G. M. H.

Dublin, October 19

### The Volcanic Dust (?) Phenomena

THE changeableness of the wisps of this dust (?) is surprising. On the 19th inst., near sunset, they were conspicuously visible in all parts of the great corona round the sun, being definite in form—narrow, and about 5° long; it was the first time I had seen them since (I believe) May 18, when they were only just perceptible. During the intervening period the film or portion of the atmosphere on which the universal sky phenomena have appeared has been perfectly uniform in texture. On the 20th inst. they were again conspicuous about sunset, extending faintly even beyond the great corona; they appeared horizontal in the north-west. They were more or less visible about the same time on the 23rd and 26th, on which latter date they could be distinguished faintly in the semicircle opposite the sun at 7.30 a.m. and 4.8 p.m.

It would be interesting to know how far the changes in their visibility are simultaneous over large districts: it appears that they are not universal, for Mr. R. Leslie (*NATURE*, October 16, p. 583) describes them as distinct though very small in the early part of July this year, at which period I never perceived a trace of them in Switzerland. I take the "cloud forms" Mr. Leslie describes to have been the same I am alluding to, though the colour seems to have then been too faint to be perceptible at Southampton. I cannot attempt to explain how the glare round the sun was visible to him in 1882 or earlier, when the red part of what seems to be the same phenomenon did not appear till so long after.

Observations on the motion of the wisps would be very useful in showing the movements of the upper currents of the atmosphere. I have made a few, but they are not very satisfactory.

The suggestion of Prof. E. Douglas Archibald (October 9, p. 560) that the dimensions of the great corona prove it to be caused by hexagonal prisms, as is the ordinary solar halo, is surely not tenable when its entirely different appearance and colour are considered; and it must arise from a different cause as hinted by Prof. Le Conte (vol. xxix. p. 403). The solar halo is a narrow ring brightest at a distance of about  $23^\circ$  from the sun; whereas this corona is brightest close to the sun, fading continuously, and at first rapidly, as the distance from the sun increases. It varies somewhat in colour, depending on the sun's altitude and other causes, but is always greenish or bluish near the sun, and at an estimated distance of  $7^\circ$  to  $10^\circ$  therefrom, rather abruptly changes to reddish or brownish. This colour is nearly the same for a great distance, though inclining to orange towards the sun, and to pink in its outer part. When seen under favourable circumstances (e.g. in Visp-thal) I have traced it faintly to a distance of fully  $75^\circ$ . The solar halo, on the other hand, is usually dull orange on the edge next the sun, and bluish towards the outside; and when its colours are very distinct, all the prismatic colours are visible, the red always being next the sun: so that the colours are in reverse order in the two phenomena, so far as they occur. Whether there is any ice concerned in the production of the corona or not, it cannot be in the form of hexagonal crystals, for there is no trace of the ordinary halo in connection with the corona; and whenever the two phenomena are visible together, the halo is always on true clouds.

Sunderland, October 27

T. W. BACKHOUSE

#### After-Glow

THE after-glow here on Sunday night, the 26th, at 6.45 p.m., was wonderfully grand, intensely bright golden colour extending from horizon to about  $45^\circ$ , and graduated into delicate rose, again graduating to pale ashy gray. Indeed at no period since first observing these after-glows (now over one year) have I seen one brighter.

Falmouth, October 28

ROBERT D. GIBNEY

#### The Distribution of Scientific Works Published by the British Government

RECENTLY I have enjoyed an opportunity of visiting a number of the scientific institutions of America, but it was with a feeling of humiliation that I learnt that several of the best-known and most important of them have to pay for works like the various Survey and *Challenger* Reports which are published by the British Government. It would have been possible perhaps to have obtained some statistics on the subject, but I must confess to having been restrained by a feeling of shame from making direct inquiries; what I did hear about it merely reached me in the course of casual conversation.

There are few of your readers probably who do not know of the extraordinary liberality of the American Government with reference to their publications, and when speaking of it to Major Powell, Director of the United States Geological Surveys, I was told by him that in his department it was considered that the cause of education, the spread of knowledge, and their own immediate objects were most effectually aided by a widespread distribution of their publications.

We owe much of this liberality, no doubt, to the forethought and generosity of our own countryman Smithson, the principal function of the Institution founded by him being to arrange for the exchange and despatch of books and specimens.

There are perhaps few directions in which the cause of science would be more directly benefited just now than by the establishment of an institution in England which would undertake the management of the exchanges of the scientific Societies of the United Kingdom. I am aware that there are paid agencies for the purpose, but what is wanted is a free agency which would undertake the duty for the large Societies and relieve those that are struggling from charges which now press heavily on their resources.

The great desideratum, however, is a man like Smithson, who, possessing wealth, would be willing to give or bequeath it for the purpose of founding such an institution. Here is an opportunity for any person of capital desirous of doing good and preserving his name to all posterity by one and the same act.

To return, however, to the main object of this letter, cannot anything be done to increase the "free list" of Government publications? Surely there must be stored away vast quantities of Survey and other serial publications which, if they were

handed over to the Smithsonian Institute, would, I feel certain, be gratefully accepted and judiciously distributed among the libraries of America.

Science and Art Museum, Dublin, October 25

V. BALL

#### Insect Pests in Ceylon

AMONGST the "Notes" in your last issue, p. 615, is an extract from a Ceylon paper of a report by Dr. Trimen as to an insect "which has caused much alarm by its depredations on cacao and cinchona plantations," and that Dr. Trimen thinks "the only serious damage to cacao comes from the *Helopeltis antonii*, which appears to be a recent importation to Ceylon, although well known in Java."

Quite recently I received from my friend Mr. R. McLachlan some fragments of several specimens of a Hemipteron which he had received from Ceylon, identified as *Helopeltis antonii*, and said to be causing damage to the planters' crops, and my correspondent, having doubts as to the proper identification, had forwarded the specimens (!) for my examination.

Before stating that an error of identification had been made, it is necessary to say what *Helopeltis antonii* really is. That species described by Dr. Signoret is a member of the Capsidae, possesses nodulose or incrassated femora, and of course, like other members of that family, may be considered as injurious to some kind of vegetation. The specimens I received (*sans* head and pronotum) had also nodulose or incrassated femora, and though somewhat similar also in colour to the *Helopeltis antonii*, clearly belonged to the family Reduviidae, whose habits and food are of a totally dissimilar character. It is therefore possible that both species occur in Ceylon; the one is being frequently mistaken for the other, a matter of some moment to the planter, as in destroying the Reduviid he may be at the same time killing the worst enemy of the real pest.

W. L. DISTANT

Russell Hill Road, Purley, Surrey

#### The Pentacrinoid Stage of *Antedon rosaceus*

I WAS somewhat surprised at finding this summer, in Lamlash Bay, on the east coast of Arran, *Antedon rosaceus* in the pentacrinoid stage readily obtainable up to the end of September, and would be glad to hear from others who have been observing *Antedon*, their experience of the duration of the stalked condition. It is well known that the adult *Antedon rosaceus* is abundant at Lamlash, and that young specimens in the pentacrinoid stage are common on *Laminaria* in the earlier part of the summer; but I have always found the "pentacrinoids" rare or absent during August, and I have certainly never before found one in September. I find that the late Sir Wyville Thomson states, in his memoir "On the Embryogeny of *Antedon rosaceus*" (*Phil. Trans.* 1865, p. 513), that the ova are mature towards the end of May or beginning of June, and that, although the time spent in the larval stages may be to a certain extent shortened or prolonged by surrounding conditions, the disengagement of *Antedon rosaceus* from its stalk "constantly occurs between the middle of August and the middle of September" (p. 517). From this one would not expect to find any specimens in the pentacrinoid stage after the middle of September. This season, however, while dredging chiefly in the southern part of the bay near King's Cross Point, I obtained young stalked *Antedons* nearly every day between September 15 and 25. I generally got one, two, or three specimens in a forenoon's dredging (usually four or five hauls of the dredge). On September 27, the last day I dredged, I found, on some *Fucus* brought up from six or seven fathoms at the south entrance to the bay, upwards of twenty specimens of "pentacrinoids." They were of all sizes, from 3 mm. up to 1 cm. in length of stalk. The last were evidently just ready to be set free, and in fact several of them became disengaged from their stalks while I was watching them in a glass dish during the afternoon. The smaller specimens obtained that day were, from their structure, evidently very much younger, and could not have become free for a considerable time: how long I do not know, and would be glad to learn. Probably they would still have been in the pentacrinoid condition had they lived.

W. A. HERDMAN

University College, Liverpool, October 21

#### Curious Phenomenon

A VERY curious phenomenon has just come under my notice, which is, I think, not unworthy of being put on record. I have